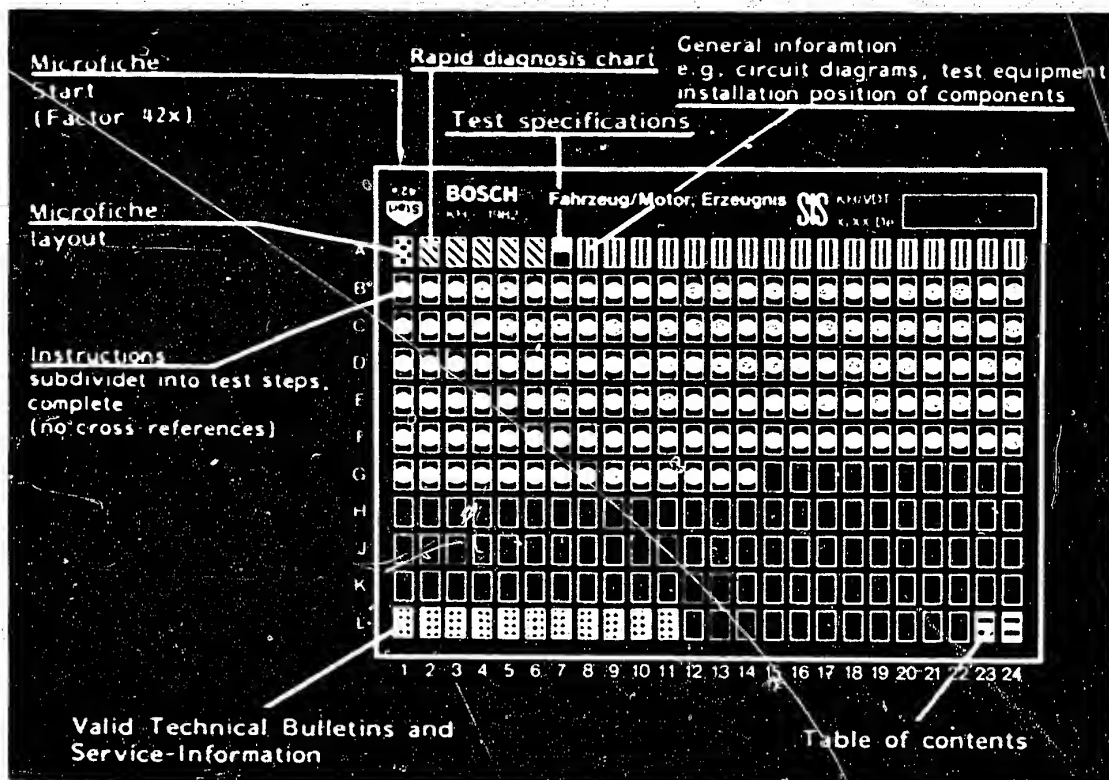


Microfiche layout



1. Read from left to right
2. Title of microfiche (appears on each coordinate)

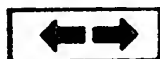
E16	Product/assembly/test step	
	Vehicle/engine	

Coordinate

3. Limits of section



Beginning



Mid-section



End



One-page section

4. Purely vehicle-specific passages in the text are marked with a vertical bar.



1. Rapid diagnosis chart

The following rapid diagnosis chart makes it possible for the experienced expert to quickly check the electrical/electronic part of the ignition system using normal workshop test equipment.

The rapid diagnosis chart contains the following information:

- Customer complaint
- Cause of the trouble
- Test instructions (if no coordinate given on the right, further possibilities for testing are indicated).
- Coordinates for detailed trouble-shooting.

If detailed information and instructions on trouble-shooting are necessary, always proceed according to the trouble-shooting program starting on coordinate B 1.



Rapid diagnosis chart

Customer complaint (symptom of trouble)

1. Starting motor operates, but engine fails to start

2. Rough idling

3. Poor throttle response

4. Engine lacks power

5. Misfiring

6. Fuel consumption too high

7. Engine pings when accelerating

8. Backfiring

9. Engine becomes too hot

Cause of trouble

Test instructions

Coordinates

●	●	●	●	●	●		●	Spark plugs defective	Assess using ignition oscillograms or remove spark plug and make visual examination.	-
●	●	●	●	●	●	●	●	Ignition timing incorrect	Set ignition timing	B 7
●	●	●	●	●				Shunt on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram or make visual examination.	-
●	●	●	●	●				Open circuit on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram, or test for continuity using ohm-meter	-
●								Open circuit on primary side	Test voltage supply to trigger box or test primary circuit	C 1
●	●	●	●	●				Ignition coil defective	Electrical test	B 5

A3

Rapid diagnosis chart

BMW Motorcycles



A4

Rapid diagnosis chart

BMW Motorcycles



Rapid diagnosis chart

Customer complaint (symptom of trouble)

1. Starting motor operates, but engine fails to start

2. Rough idling

3. Poor throttle response

4. Engine lacks power

5. Misfiring

6. Fuel consumption too high

7. Engine pings when accelerating

8. Backfiring

9. Engine becomes too hot

									<u>Cause of trouble</u>	<u>Test instructions</u>	<u>Coordinates</u>
		●	●	●	●				Interference-suppression resistors defective	Assess using ignition oscillogram or perform resistance measurement.	-
	●	●	●		●	●	●	●	Centrifugal advance defective	Test centrifugal advance	B 7
●									Trigger box defective	Test peak-coil-current cut-off, primary voltage.	B 11
●									Ignition-triggering unit/pick-up system defective	Check triggering unit pick-up lead Check voltage supply and magnetic pick-up assembly operation.	C 5 C 7 C 9,C11

A5

Rapid diagnosis chart

BMW Motorcycles



A6

Rapid diagnosis chart

BMW Motorcycles

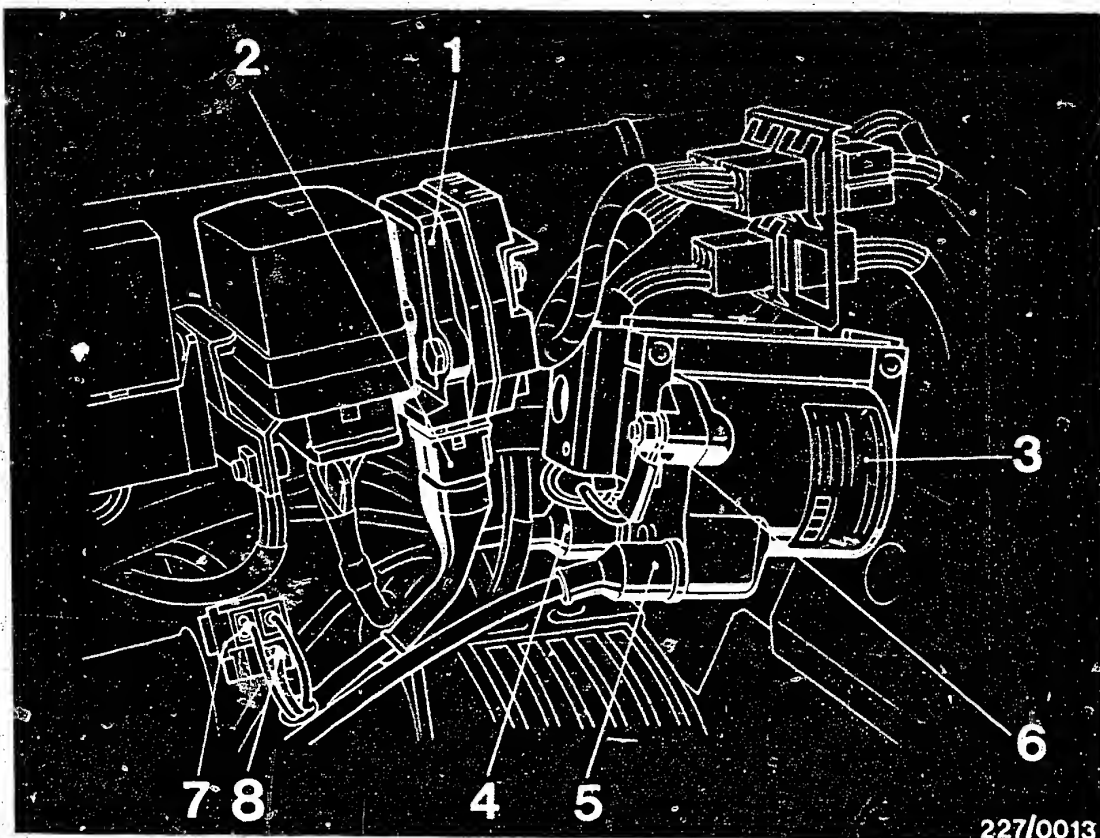


2. Test specifications

Ignition coil primary	1.1...1.7 Ω	B5
Ignition coil secondary	6.6...11.6k Ω	
Voltage supply Trigger box	12...14 V	B9
Voltage supply Ignition coil	10 V	
Peak-coil-current cut-off approx. 1 s after	approx. 5 V 0 V	B11
Primary voltage with engine idling	340...390 V	
Voltage supply Magnetic pickup assembly max.	1...3.5 V below U_B	C7
Magnetic pickup assembly operation		
Vane outside air gap	0...0.7 V	C9
Vane in air gap	1.8 V... U_B	
		C11

See Autodata test specifications for settings for ignition, idle speed, exhaust gas, valve clearance, etc.





227/0013

- 1 = TZ-H trigger box
- 2 = Trigger-box plug
- 3 = Ignition coil
- 4 = Ignition coil term. 4b
- 5 = Ignition coil term. 4a
- 6 = Ignition coil term. 1
- 7 = Plug-in connection for ignition coil term. 15
- 8 = Plug-in connection for ignition coil term. 1

4. Location of components

The ignition coil and TZ-H trigger box are located underneath the fuel tank.

5. Necessary test equipment, aids

Motortester e.g.	MOT 002.00	0 684 000 200
Spark gap e.g.		
Ignition-coil and condenser tester or	EFAW 106 A	0 681 100 001
Single spark gap	EF 1177/7	1 684 531 000
5 k Ω sleeve-type suppressor		0 356 500 001
Ohmmeter	ETE 014.00	0 684 101 400
or e.g.	Pontavi Wh2	Commercially available
Ammeter		Commercially available
(with mA measuring range)		
Voltmeter ETE 014.00 ($R_i \geq 50k\Omega/V$)		0 684 101 400
Voltmeter ETT 004 ($R_i \geq 50k\Omega/V$)		0 684 100 400
Voltmeter KTE 001.03 ($R_i \geq 50k\Omega/V$)		0 684 400 103
Voltmeter MOT 001.03 ($R_i \geq 50k\Omega/V$)		0 684 000 103
Voltmeter MOT 201 ($R_i \geq 50k\Omega/V$)		0 684 000 201
Voltmeter MOT 202 ($R_i \geq 50k\Omega/V$)		0 684 000 202



6. Danger of accident on electronic ignition systems

Increased demands of modern engines on the ignition system combined with the desire for freedom of maintenance have recently led to electronic ignition systems being fitted as standard. Usually the ignition power of electronic systems (of almost all manufacturers) is higher than that of conventional systems, and there are signs of further increases in power. Electronic ignition systems thus reach a power range which can be highly dangerous if live parts or terminals are touched (both on the primary as well as the secondary sides).

In this connection we should like to point out that the VDE regulations, in particular VDE 0104/7.67 and/or the respective national regulations must be followed when testing or working on the ignition system.

The ignition should always be switched off when working on the ignition system (switch off ignition or voltage source). Such work includes:

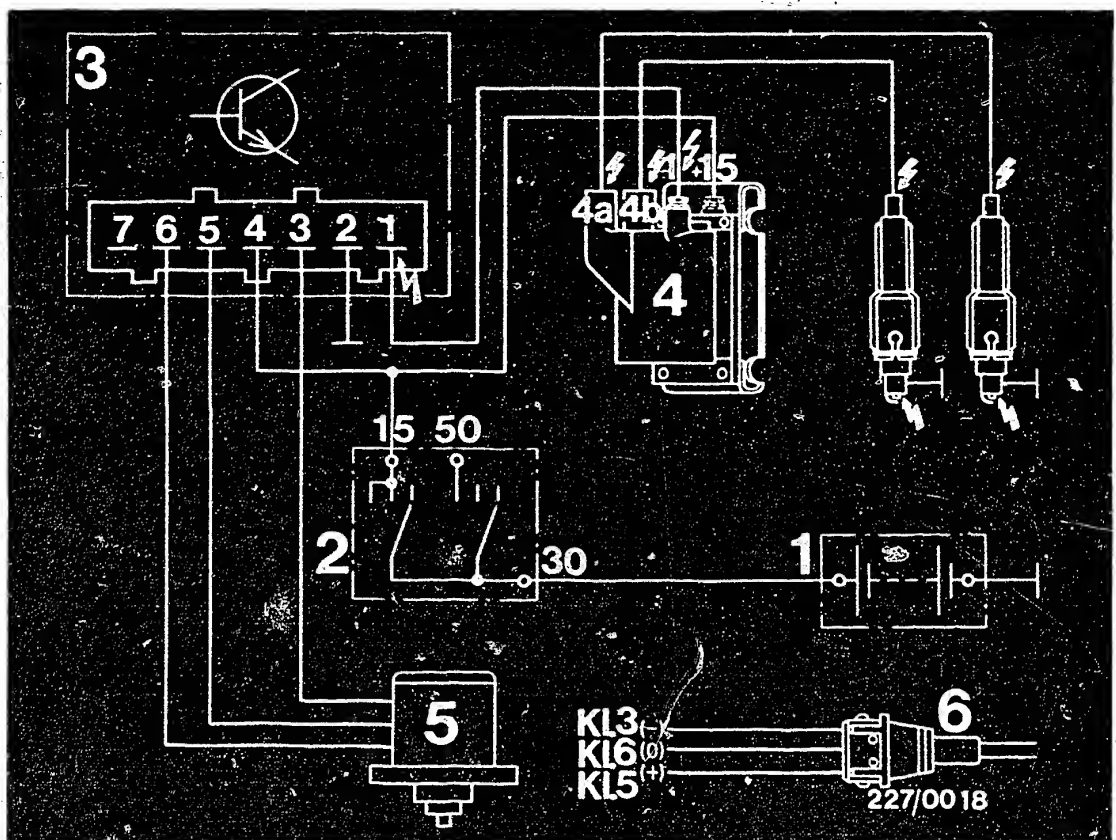
- Connecting of engine test equipment (timing light, dwell-tach tester, ignition oscilloscope, etc.).
- Replacing parts of the ignition system (spark plug, ignition coil, H.T. ignition cable, etc.).



If, while testing the ignition system or during adjustment work on the engine (e.g. carburettor), it becomes necessary to switch on the ignition (switch on ignition or voltage source), the above-mentioned dangerous voltages occur over the entire system.

The danger of accident exists, therefore, not only on the individual assemblies of the ignition system (e.g. ignition coil, trigger box, ignition harness), but also on the wiring harness (e.g. tachometer connection, diagnostic plug), at plug-in connections and test equipment.





- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Two-spark ignition coil
- 5 = Ignition-triggering unit
- 6 = Ignition-triggering unit connector

⚡ = Dangerous voltages (400 V - 25 kV)

Electrical terminal diagram

The dangerous locations are marked with danger arrows taking the example of the terminal diagram of an electronic ignition system.

7. Incorrect indication of engine speed, dwell angle and ignition point

In ignition systems with trigger boxes 0 227 100 103,...113 (TI-h) with current limitation there may be an incorrect indication of engine speed, dwell angle and ignition point on testers.

For further details see Coordinates L 4 - L 8.



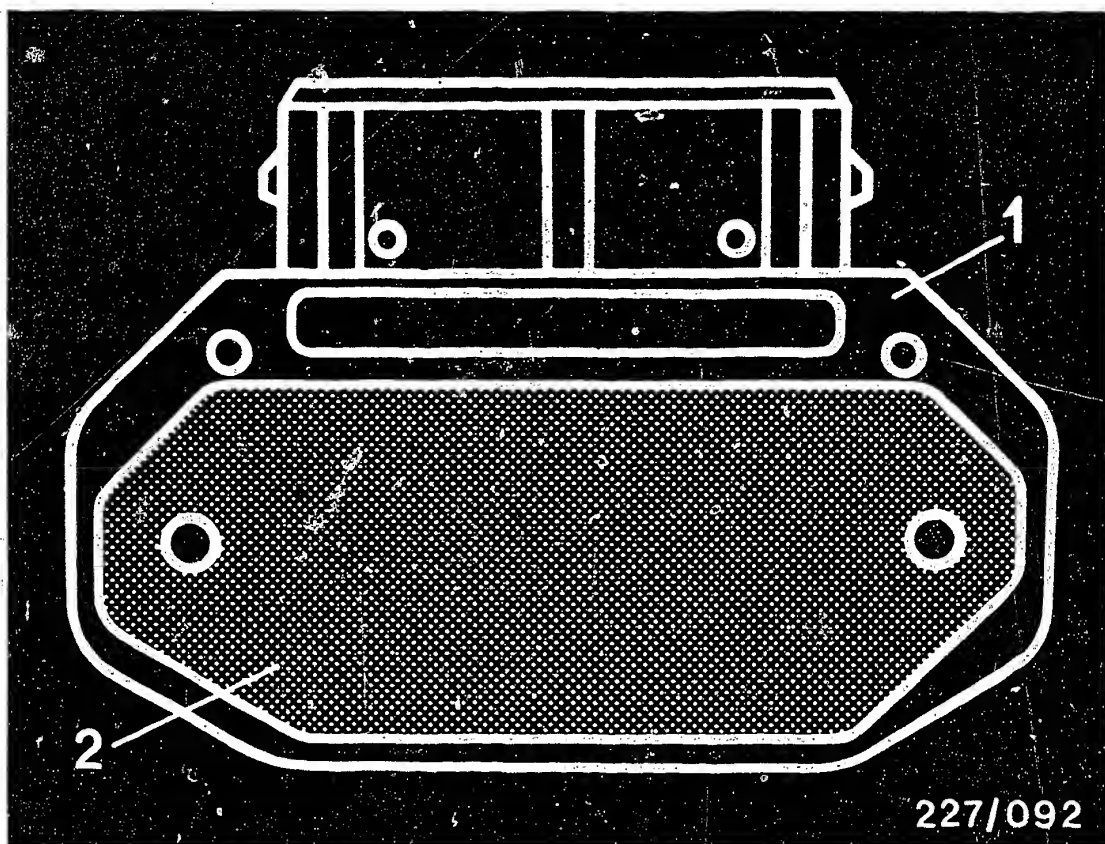
8. Important vehicle information

- When testing compression, disconnect trigger-box plug or firmly ground ignition coil terminal 4a and terminal 4b using auxiliary cable (dangerous high voltage, insulation damage to ignition coil, ignition harness).

Note: Auxiliary cable must have interference suppression of at least 2 k Ω , e.g. sleeve-type suppressor (5 k Ω) 0 356 500 001.

- Only perform resistance measurements with the ignition switched off or with the battery disconnected (danger of meter damage).



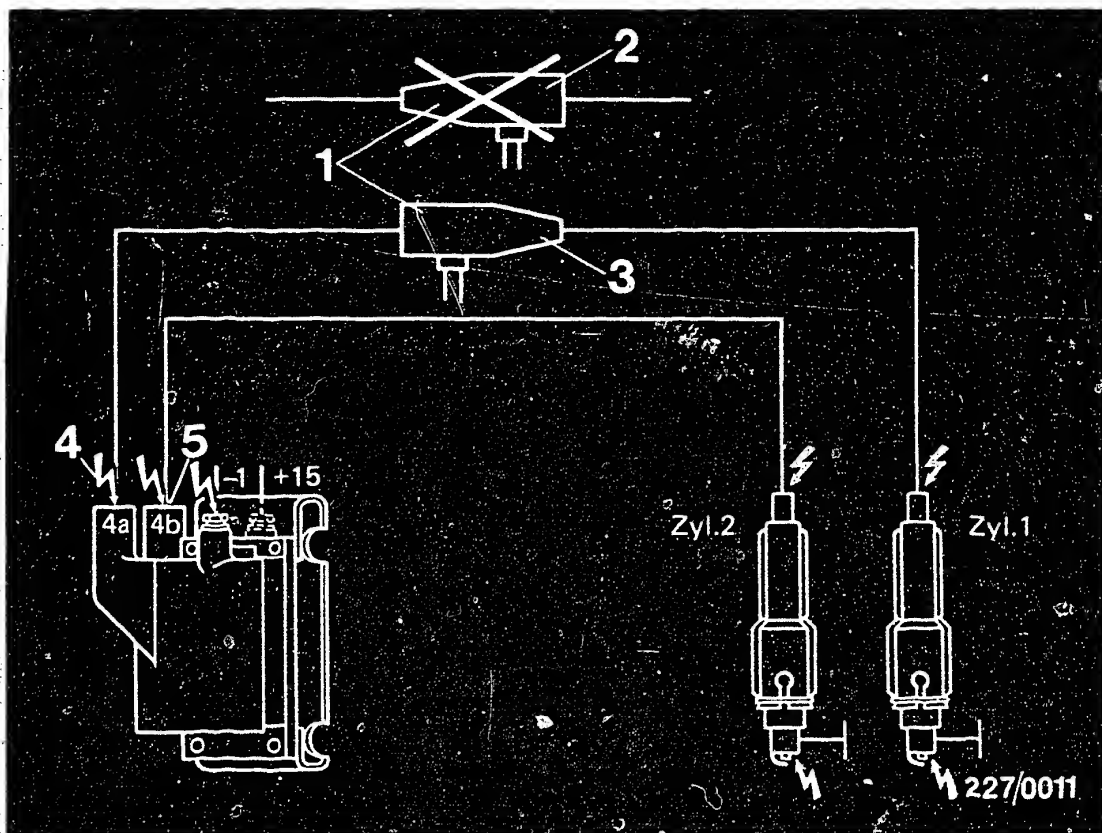



227/092

- 1 = Trigger box
- 2 = Baseplate

- Before the trigger box is fitted, the baseplate must be coated with thermal conduction paste.

The thermal conduction paste must be applied with a suitable object (screwdriver, matchstick etc.). The paste must not get onto painted parts.



 = Dangerous voltages (400 V - 25 kV)

1 = Tubular pickup from the timing light

2 = Wrong connection

3 = Correct connection

4 = Negative high voltage (Terminal 4a)

5 = Positive high voltage (Terminal 4b)

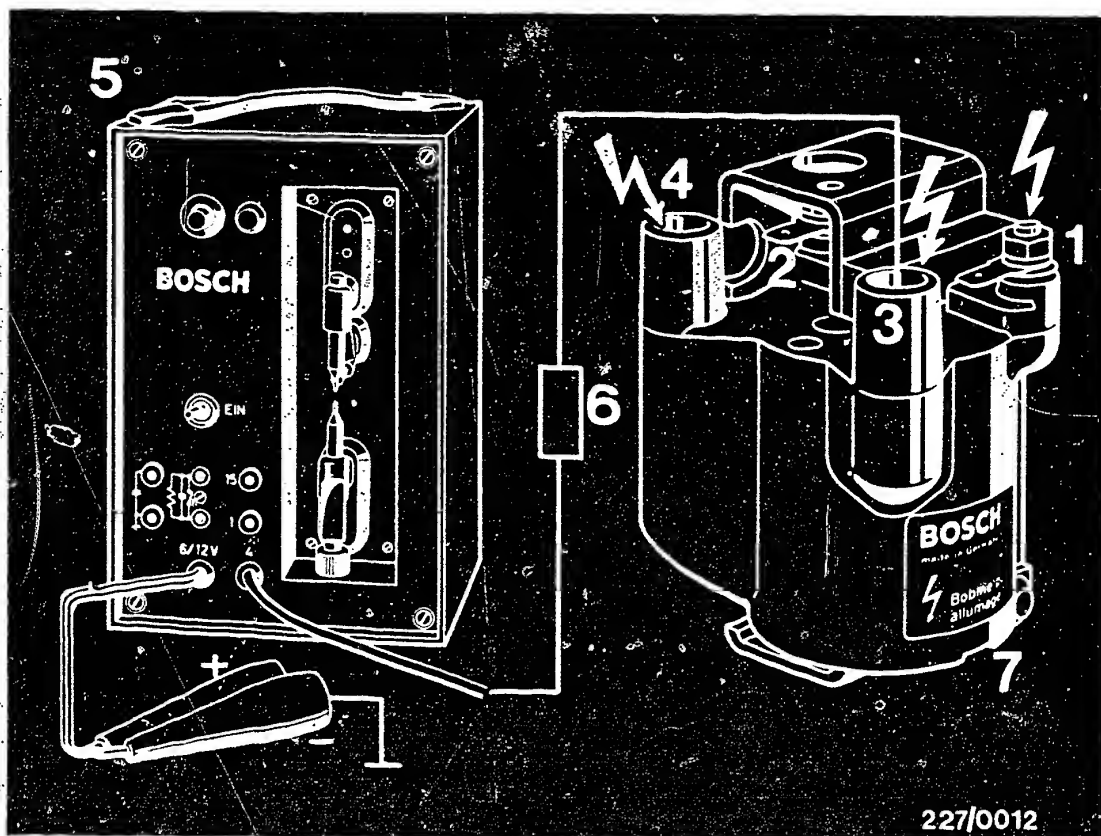
- In the case of timing lights where the inductive pickup must be connected in the right direction, care must be taken that the red tubular pickup is connected in the line to Terminal 4a so that the pointed end is towards the spark plug (see Fig.). Otherwise the indication of ignition point will be incorrect.

The two-spark ignition coil always delivers a negative high tension at one ignition coil output and simultaneously a positive high tension at the other ignition coil output. When adjusting, therefore, it must be clear which cylinder has which polarity.

Timing lights with a clamp-on induction pickup are not directionally-dependent; in this case the polarity is of no importance. When using timing lights with a timing-advance meter, note that the angle indicated must be halved.

- The engine can only be started with the transmission in neutral or with the clutch disengaged (starting lock). It is thus impossible to start the engine by mistake with the motorcycle in gear. With the ignition on, a green light (below the tachometer) indicates that the transmission is in neutra.
- In order to prevent the trigger box from being irreparably damaged, interference suppression on the secondary side of the ignition system must be at least 2 k Ω .





⚡ = Dangerous voltages (400 V - 25 kV)

1 = Terminal 1

5 = Spark gap

2 = Terminal 15

6 = Sleeve-type suppressor

3 = Terminal 4a

5 k Ω

4 = Terminal 4b

7 = Ignition coil

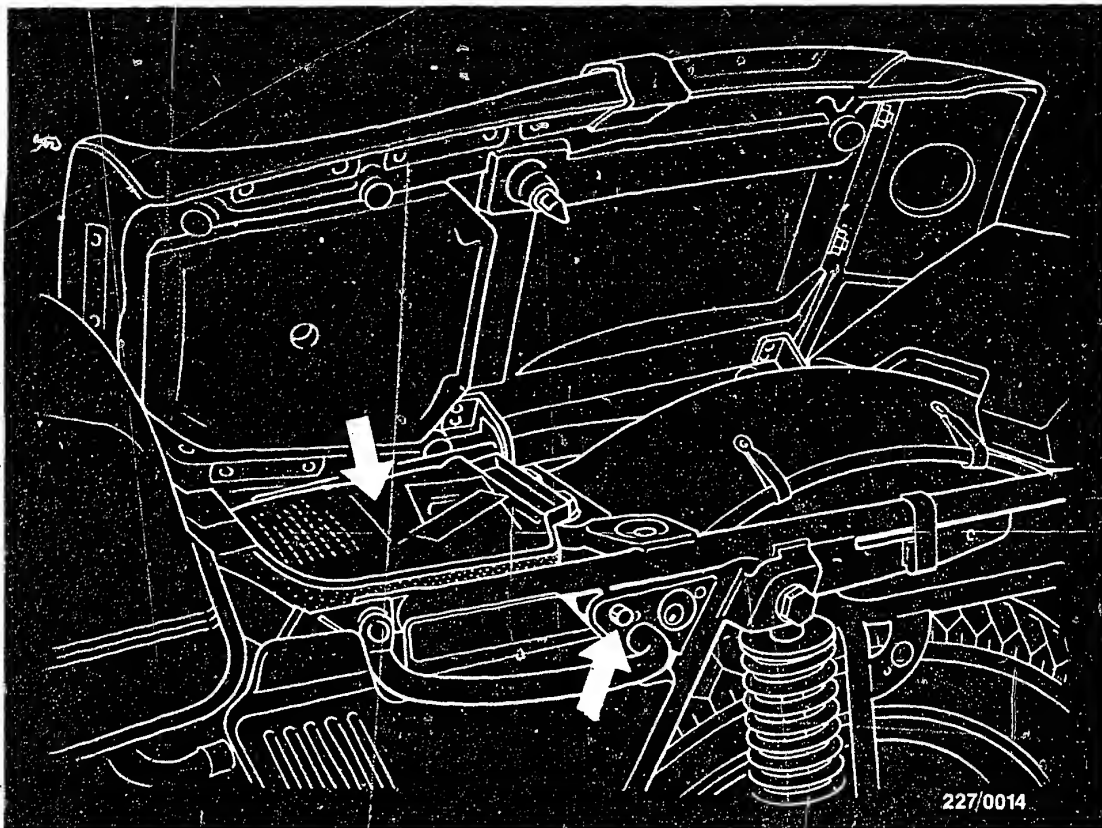
● When using a spark gap, a resistor must be connected between the spark gap and the ignition coil Terminal 4a in order to prevent destruction of the trigger box. The suppression resistor must be at least 2 k Ω , e.g. a sleeve-type suppressor (5 k Ω) 0 356 500 001.

● External voltage (e.g. ohmmeter) must not be connected to the ignition-trigger vane switch (Hall generator).

Care must be taken when switching measuring ranges.

- The lines from the Hall generator to the trigger box must be laid separately from other lines. There must be at least 100 mm distance between Hall generator lines and the ignition cables and the line from terminal 1 of the trigger box to terminal 1 of the ignition coil (Hall generator will be destroyed).
- Do not disconnect battery while engine is running.
- Incorrect battery polarity will lead to the destruction of the magnetic pickup assembly of the ignition-triggering unit, and of trigger box and ignition coil.
- Do not use a starting aid with more than 16 V or a fast charger for starting.
- The specified ignition coil (see Part No.) must not be replaced with a different ignition coil.
- No suppression capacitor must be connected to ignition coil terminal 1 and terminal 15.
- Ignition coil terminal 1 must not be brought into contact with ground as a theft-proofing measure (ignition coil will be destroyed when ignition is switched on).
- Battery + or test lamp must not be connected to ignition coil terminal 1 (trigger box will be destroyed).
- Ignition cables to ignition coil terminal 4a and terminal 4b, including spark-plug connectors, must not be disconnected during operation.
- There must be no sparkover voltage from ignition coil terminals 4a and 4b to terminals 1 and 15 as this could lead to the destruction of the trigger box.

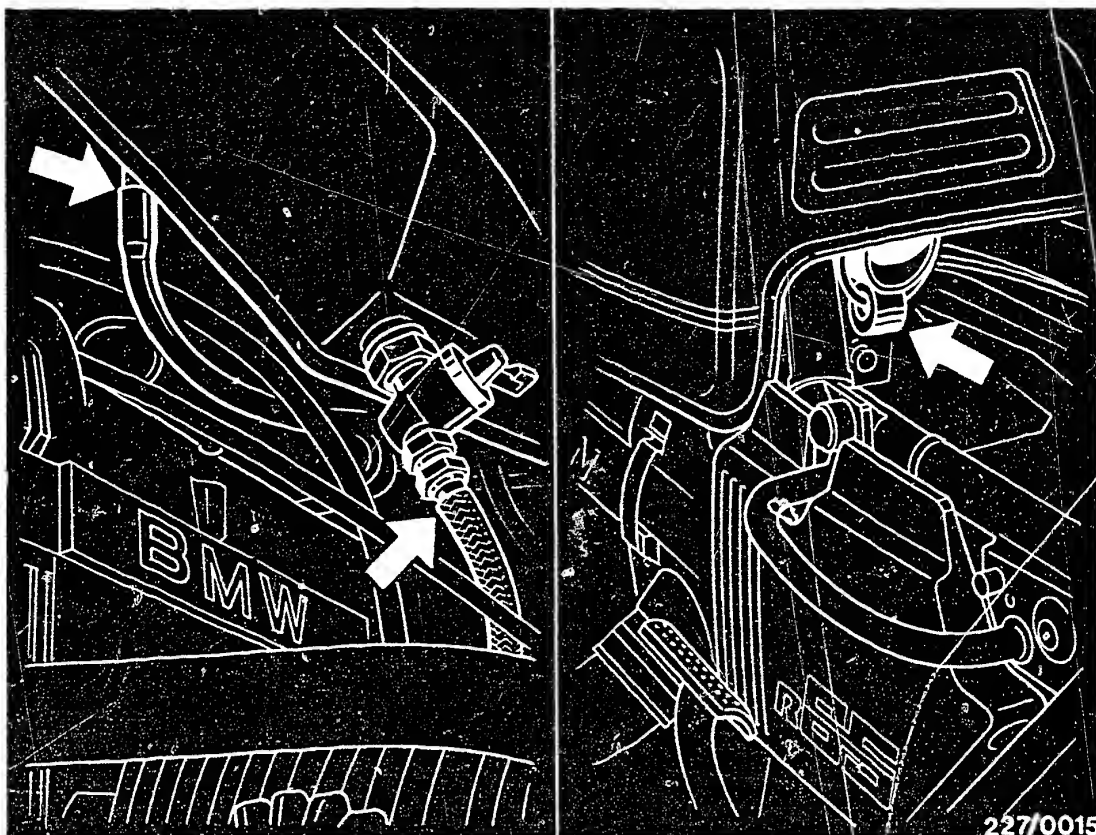




9. Necessary preliminary work for the following tests

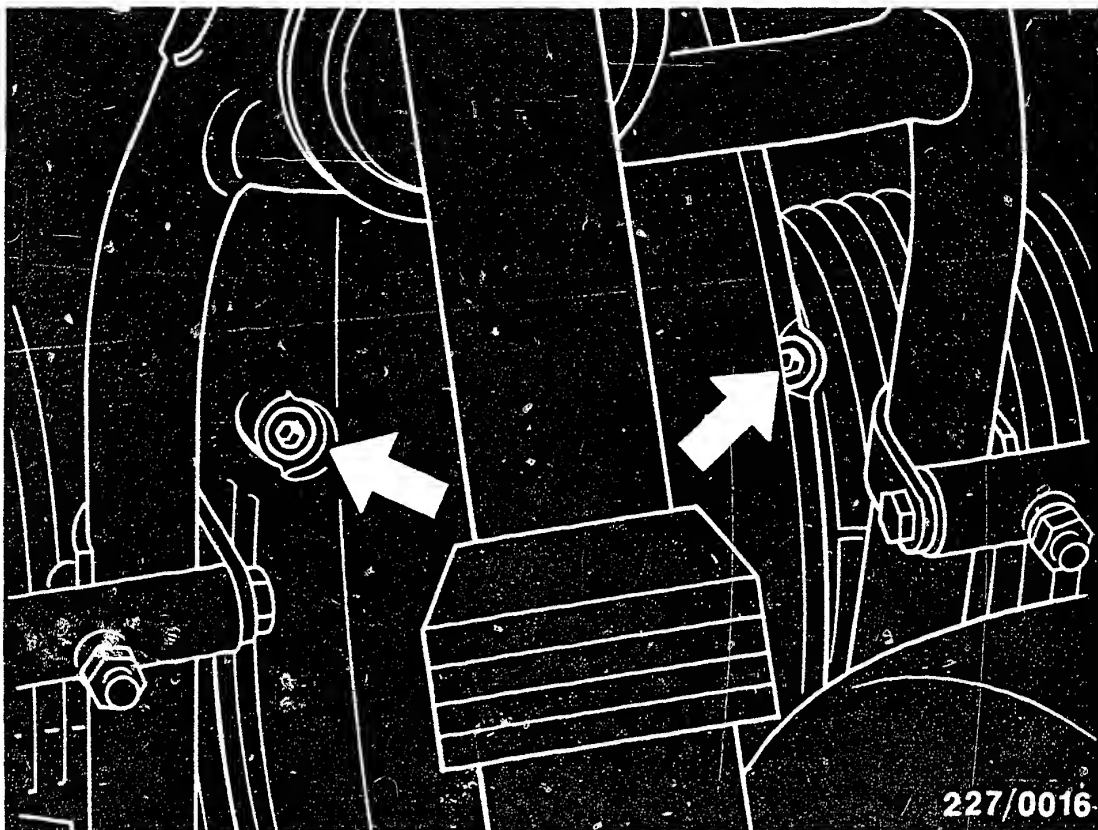
Hinge up the seat bench (depress unlocking button)
and remove the tool container.
(See arrows)





Close the fuel stopcock. Remove the fuel and overflow hoses (arrows in left-hand picture). Undo tank mounting bracket. Take off tank (arrow in right-hand picture).





227/0016

Take off front engine-protection cover. Screw out hexagon-socket-head cap screw (arrows).

A23

Preliminary work for tests
BMW motorcycle



10. Trouble-shooting program

Procedure

The trouble-shooting program is divided into 3 rows of boxes.

The left-hand row contains test instructions and test specifications.

The center row contains repair instructions.

The right-hand row contains the illustrations/terminal diagrams belonging to the text and the explanation of the items in the picture.

If the questions asked in the left-hand row can be answered conclusively with "Yes", then proceed to the next test down.

If the answer to the question is "No", branch to the center row and carry out the tests given there.

Before testing, make sure of the following:

Battery fully charged, fuel system O.K., engine mechanically O.K. (e.g. compression, valve clearance etc.). Ambient temperature/ignition system temperature 0° to +100°C (temperature has a considerable effect on measured values).



Beginning of trouble-shooting program

Starting motor operates, engine fails to start or misfires or lacks power.

Yes

Continued on B 3/4

B2

Trouble-shooting program

BMW Motorcycles



Yes

Check the primary signal. If an oscilloscope or tachometer tester are not available, check that an ignition spark is present across the spark gap.

Checking the primary signal with the oscilloscope:

Connect the oscilloscope to the ignition coil as per the operating instructions.

Start the engine.

The oscilloscope must display a primary voltage (the magnitude of the voltage is unimportant).

Checking the primary signal with the tachometer tester:

Connect the tachometer tester to the ignition coil as per the operating instructions.

Start the engine.

The tester must display a value (the magnitude is unimportant).

Ignition spark at spark gap:

Pull the ignition lead from ignition coil Terminal 4a. Connect the spark gap together with the sleeve-type suppressor (5 k Ω) to the ignition coil as shown in the figure.

Do NOT pull off the spark-plug connector."

Set the spark gap to 5 mm.

Sparks must be present across the spark gap.

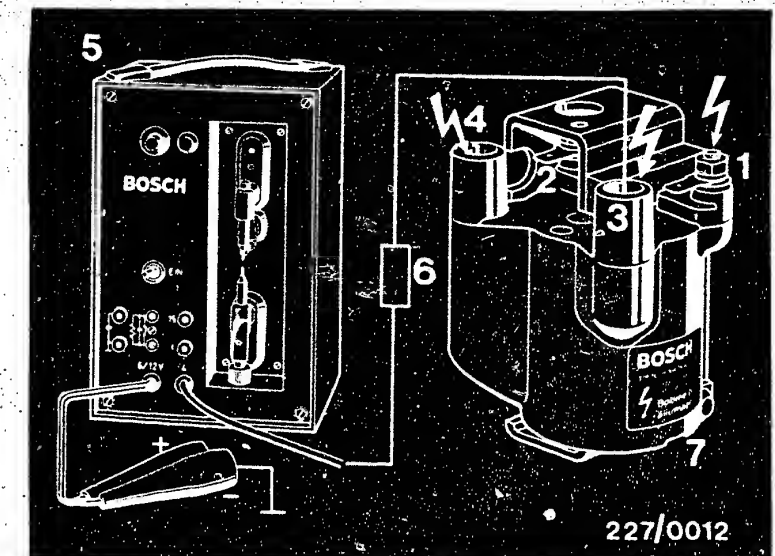
Is the primary signal present or are there sparks across the spark gap?

Yes

Cont'd B5/6

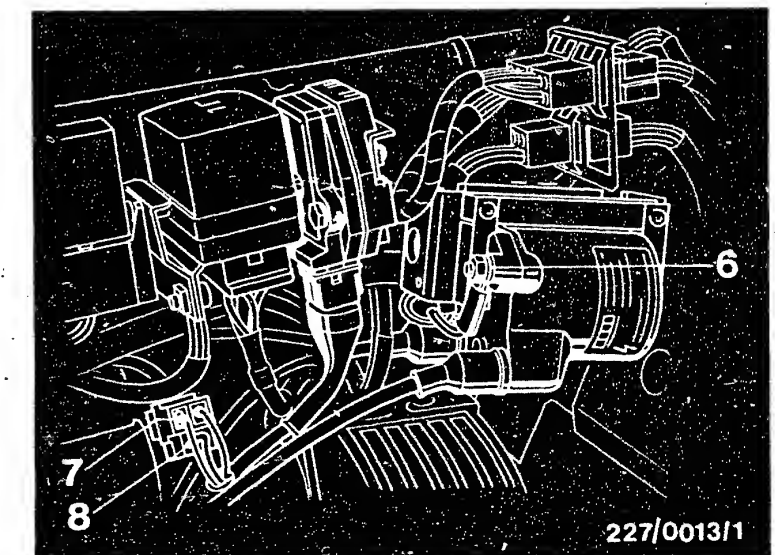
No

If the primary signal is not present, or there are no sparks across the spark gap, the tests are to be continued at C1. The tests as from B5 are unnecessary.



- 1 = Term. 1 ⚡ Dangerous voltages
- 2 = Term. 15 ⚡ (400 V - 25 kV)
- 3 = Term. 4a
- 4 = Term. 4b
- 5 = Spark gap
- 6 = Sleeve-type suppressor 5 k Ω
- 7 = Ignition coil

- 6 = Ignition coil Term. 1
- 7 = Plug conn'n ign. coil Term. 15
- 8 = Plug conn'n ign. coil Term. 1



B3

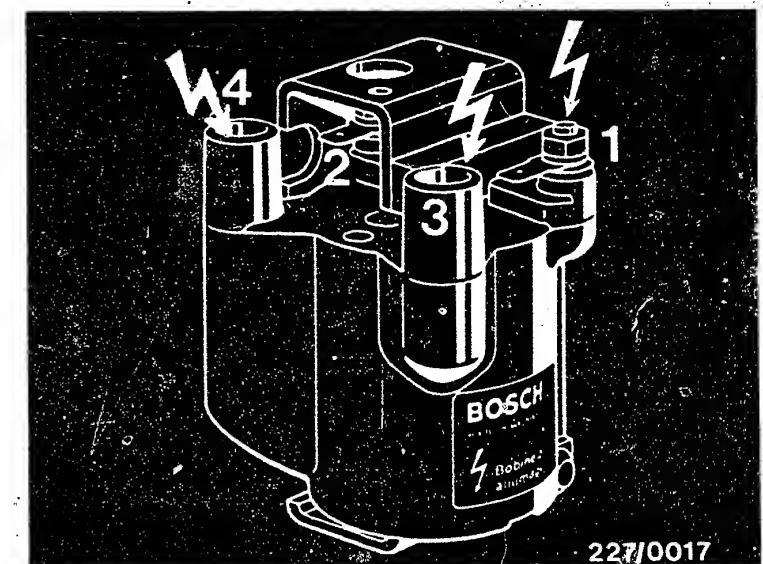
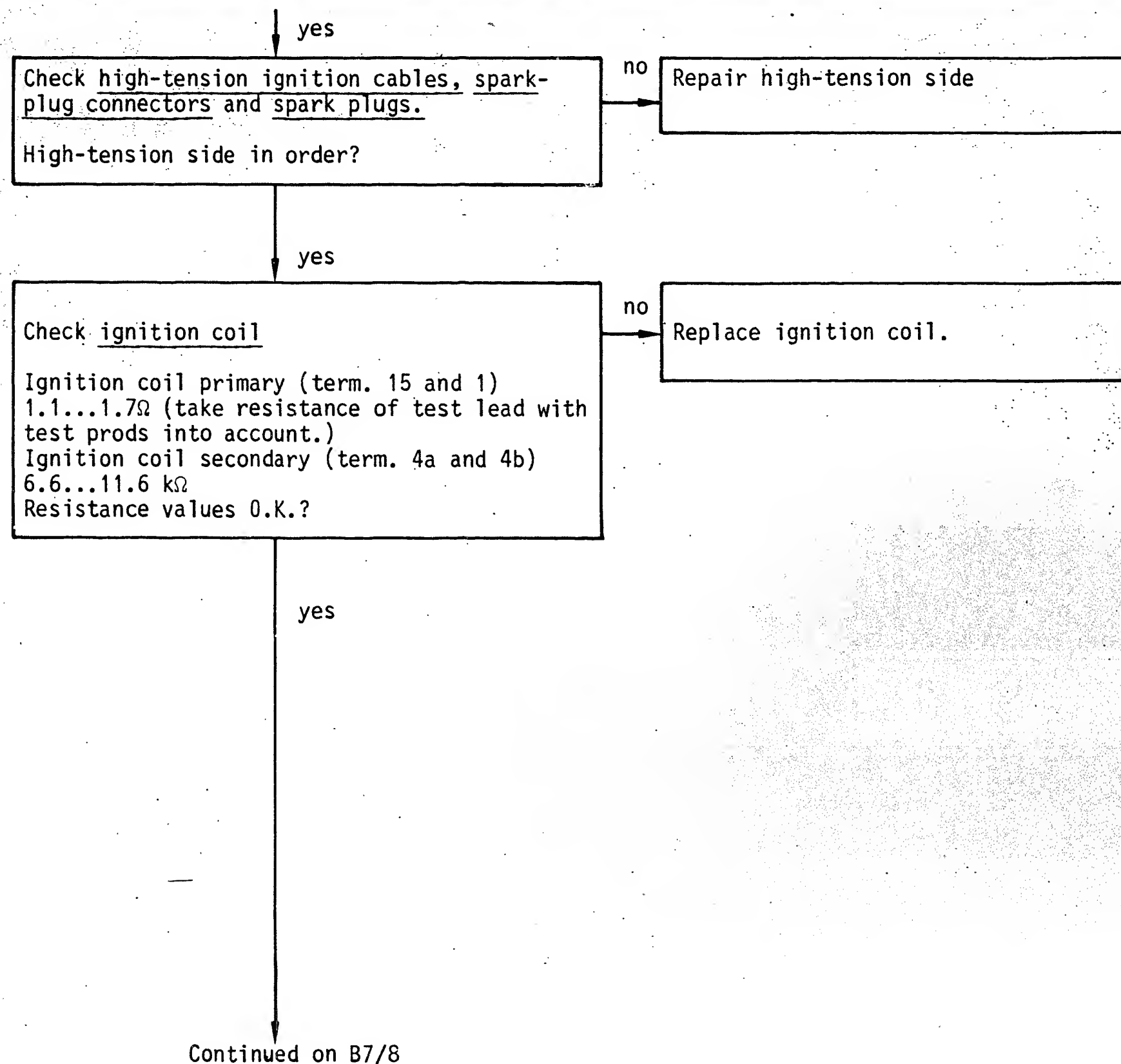
Trouble-shooting program
BMW motorcycle



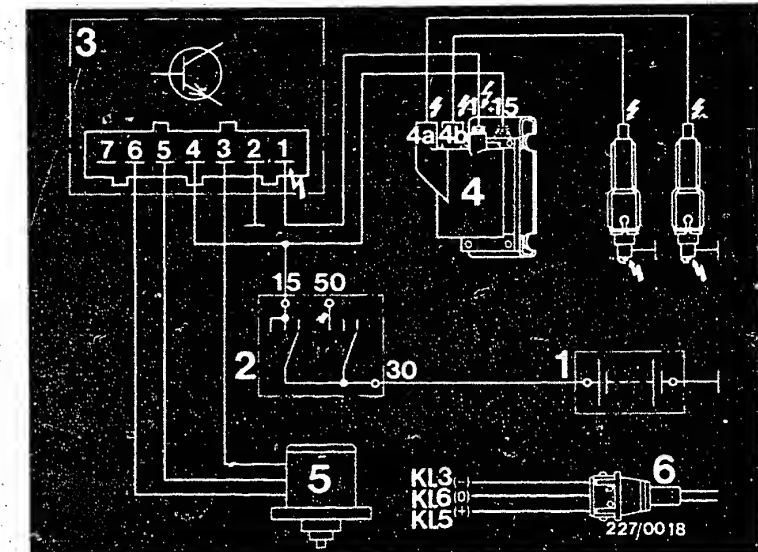
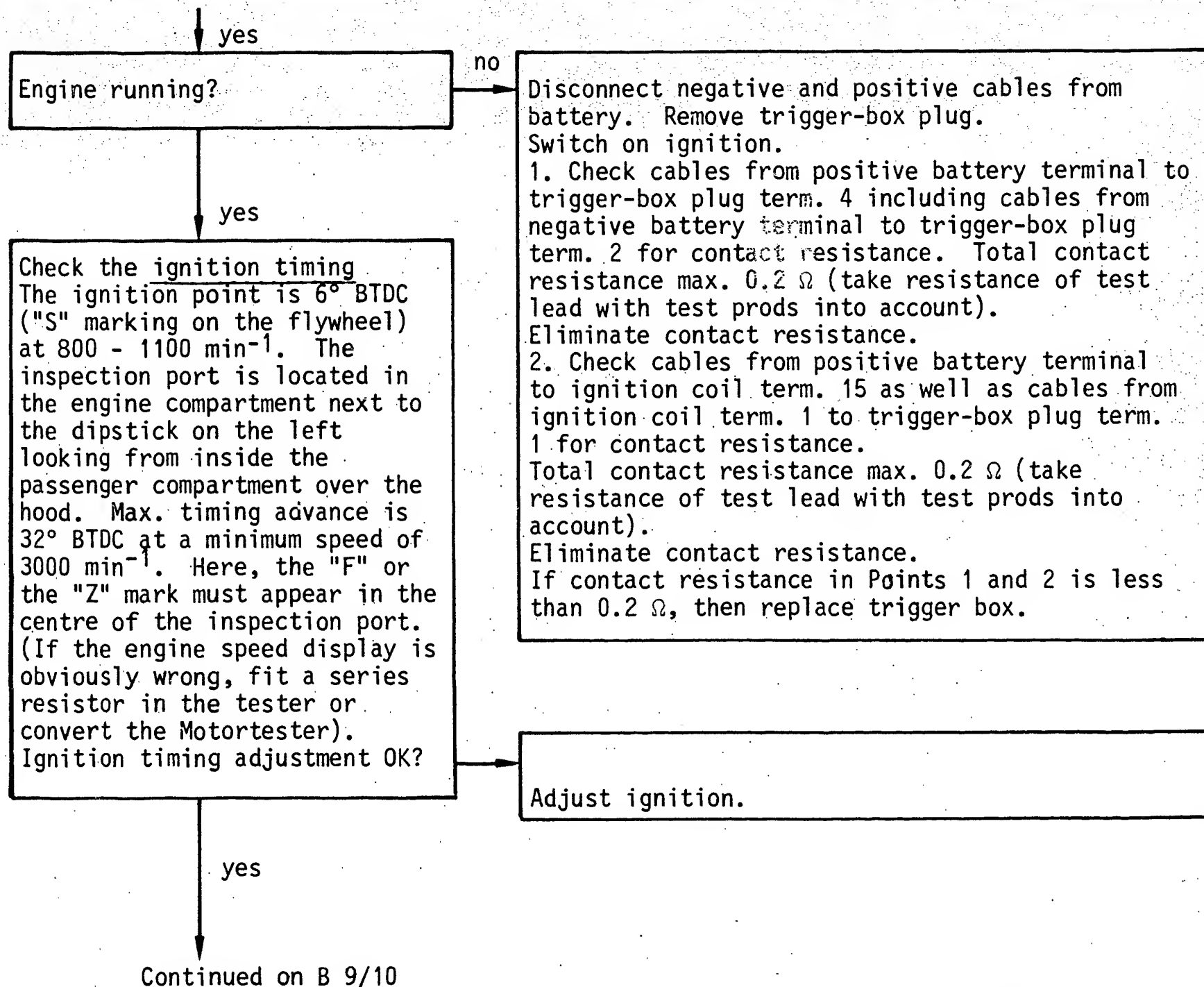
B4

Trouble-shooting program
BMW motorcycle





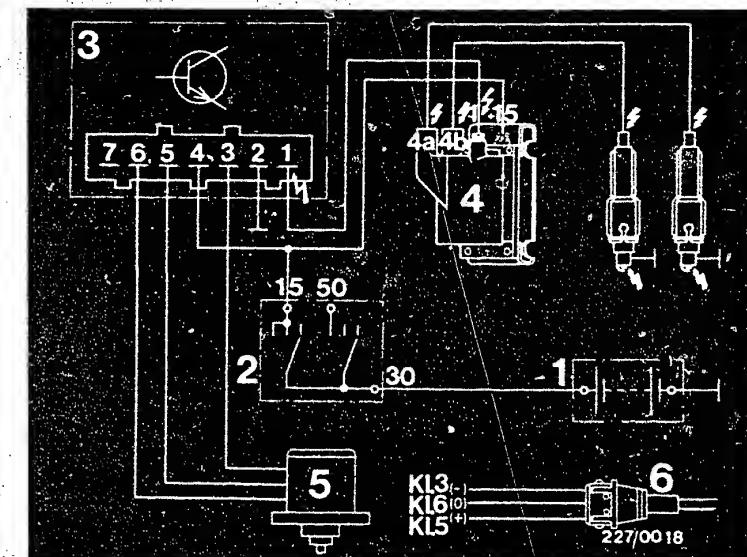
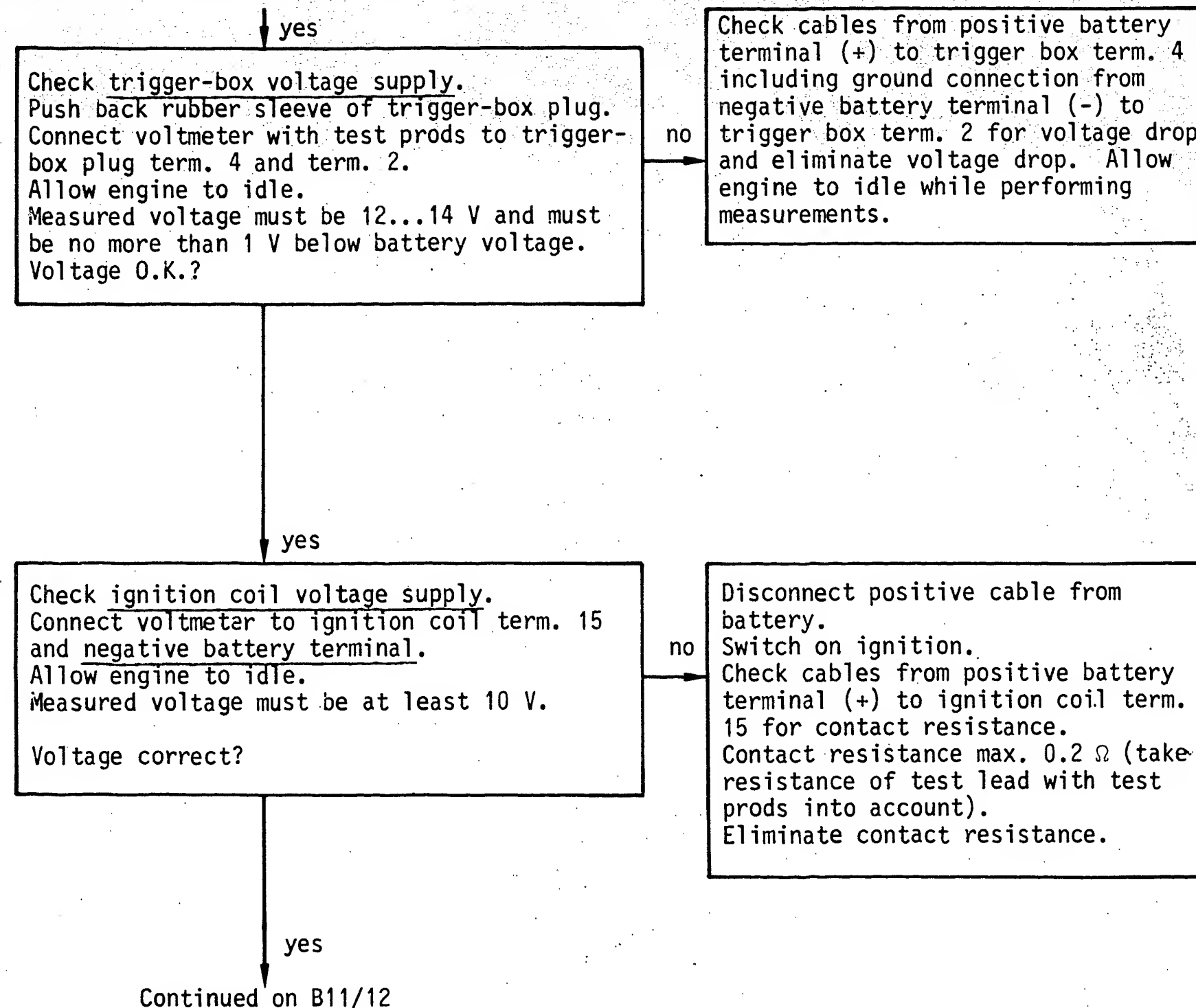
- 1 = Term. 1
- 2 = Term. 15
- 3 = Term. 4a
- 4 = Term. 4b



⚡ Dangerous voltages
 (400 V - 25 kV)

- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Two-spark ignition coil
- 5 = Ignition-triggering unit
- 6 = Ignition-triggering unit connector





⚡ Dangerous voltages
(400 V - 25 kV)

- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Two-spark ignition coil
- 5 = Ignition-triggering unit
- 6 = Ignition-triggering unit connector



↓ yes

Check peak coil current cut-out.
Remove cover from ignition-triggering unit.
Using hexagon-socket-screw key (see picture),
turn engine over by hand in a clockwise
direction until vane is completely in air
gap of magnetic pickup assembly (arrow).

Connect voltmeter to ignition coil term. 1
and term. 15.
Switch on ignition.

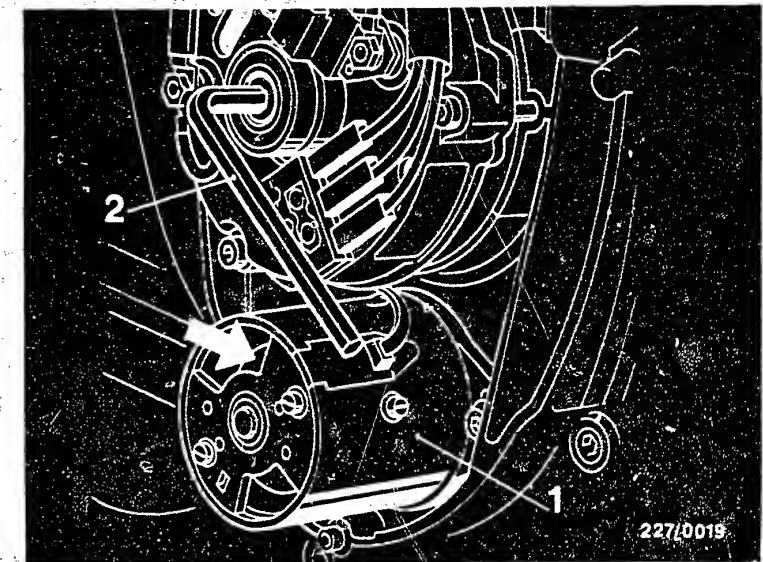
Voltmeter deflects slightly (approx. 9 V)
for approx. 1 sec in the case of trigger box
0 227 100 103,
for approx. 5 sec in the case of trigger box
0 227 100 113.

Voltmeter must return to 0 V.
Voltage (0 V) correct?

no → Replace trigger box and ignition
coil.

yes

Continued on B13/14



1 = Ignition-triggering unit without
cover
2 = Hexagon-socket-screw key

B11

Trouble-shooting program

BMW motorcycle

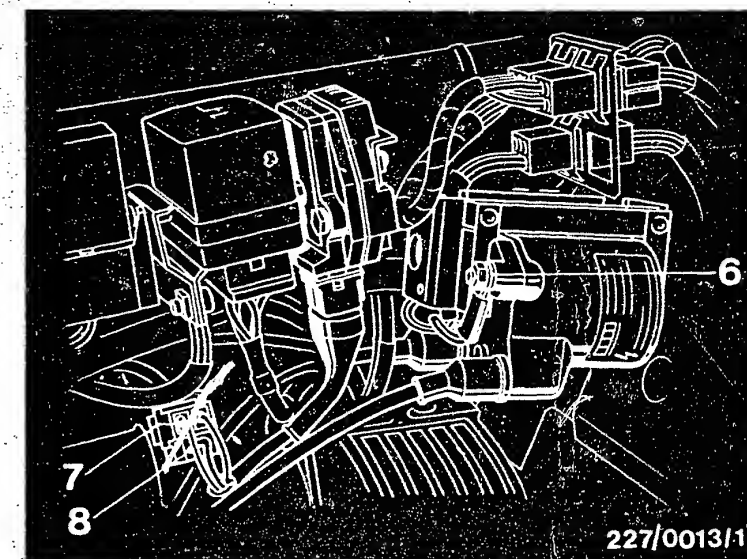


B12

Trouble-shooting program

BMW motorcycle





- 6 = Ignition coil term. 1
- 7 = Plug-in connection for ignition coil term. 15
- 8 = Plug-in connection for ignition coil term. 1

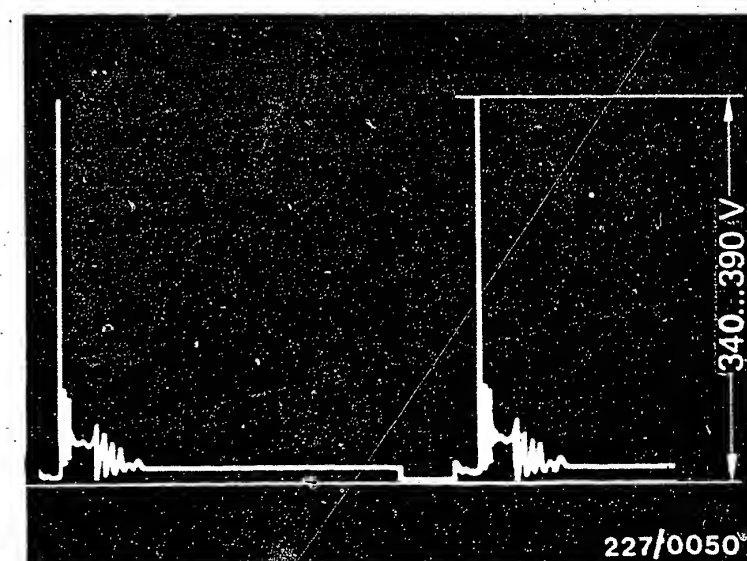
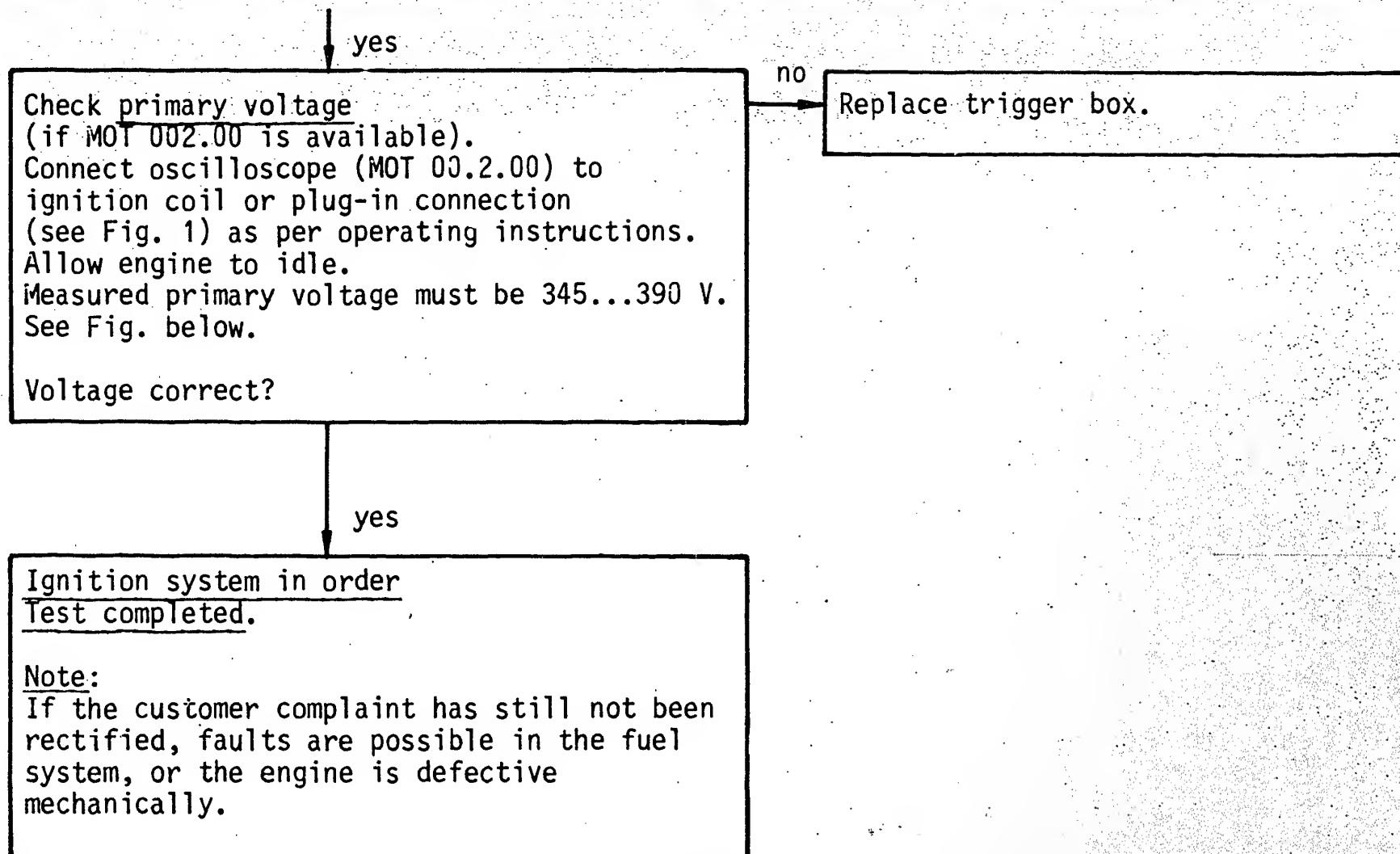


Fig. 2



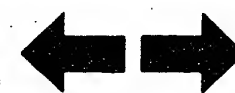
B 13

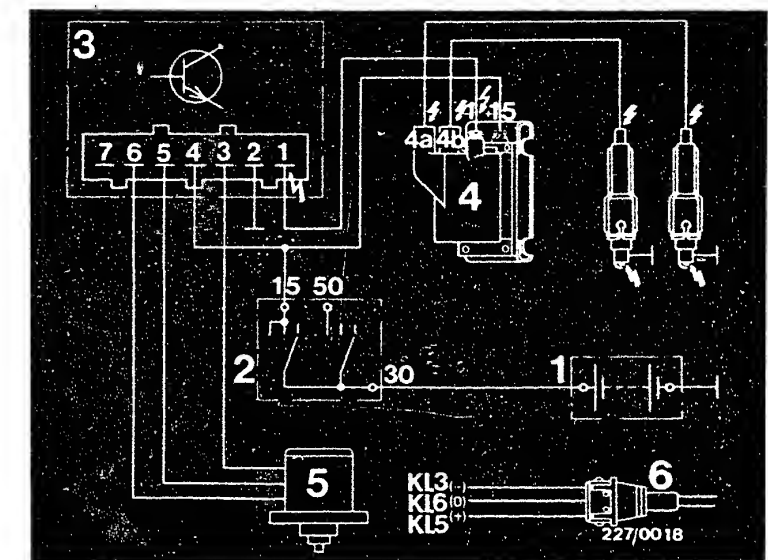
Trouble-shooting program
BMW motorcycle



B 14

Trouble-shooting program
BMW motorcycle





**⚡ Dangerous voltages
(400 V - 25 kV)**

- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Two-spark ignition coil
- 5 = Ignition-triggering unit
- 6 = Ignition-triggering unit connector

KL = Terminal

yes
No primary voltage/no ignition spark.
(Continued from B 3)

yes
Check trigger-box voltage supply.
Remove trigger-box plug.
Connect voltmeter to trigger-box plug between
term. 4 and term. 2.
Switch on ignition. Voltmeter must indicate
battery voltage.
Voltage correct?

no

Check cables and terminals from
ignition switch to trigger-box plug
term. 4 including ground cable term.
2 for open circuit. Eliminate open
circuit.

yes

Check primary circuit.
Connect voltmeter to disconnected trigger-
box plug between term. 1 and term. 2. Switch
on ignition.
Voltmeter must indicate battery voltage.
Voltage correct?

no

Check cable from ignition switch to
ignition coil term. 15, primary
winding of ignition coil and cable
from ignition coil term. 1 to
trigger-box plug term. 1 including
ground cable term. 2 for open
circuit.
Eliminate open circuit.

yes

Continued on C 3/4

C1

Trouble-shooting program
BMW motorcycle



C2

Trouble-shooting program
BMW motorcycle



yes

Check ignition coil.

Ignition coil primary (term. 1 and term. 15)
1.1...1.7 Ω (take resistance of test lead
with test prods into account).

Ignition coil secondary (term. 4a and 4b)
6.6...11.6 k Ω .

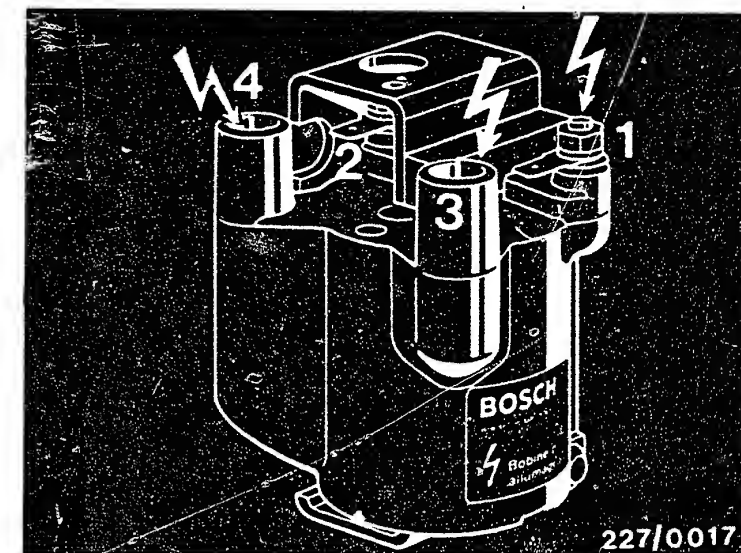
Resistance values O.K.?

no

Replace ignition coil.

yes

Continued on C 5/6



- 1 = Term. 1
- 2 = Term. 15
- 3 = Term. 4a
- 4 = Term. 4b

C3

Trouble-shooting program

BMW motorcycle



C4

Trouble-shooting program

BMW motorcycle



yes

Check ignition-triggering unit pick-up lead.
Remove 3-pole ignition-triggering unit
connector from plug housing.
Connect ohmmeter consecutively to

Trigger-box
plug

Ignition-triggering unit
plug housing

Term. 5

Term. +

Term. 6

Term. 0

Term. 3

Term. -

Ohmmeter must always indicate continuity.

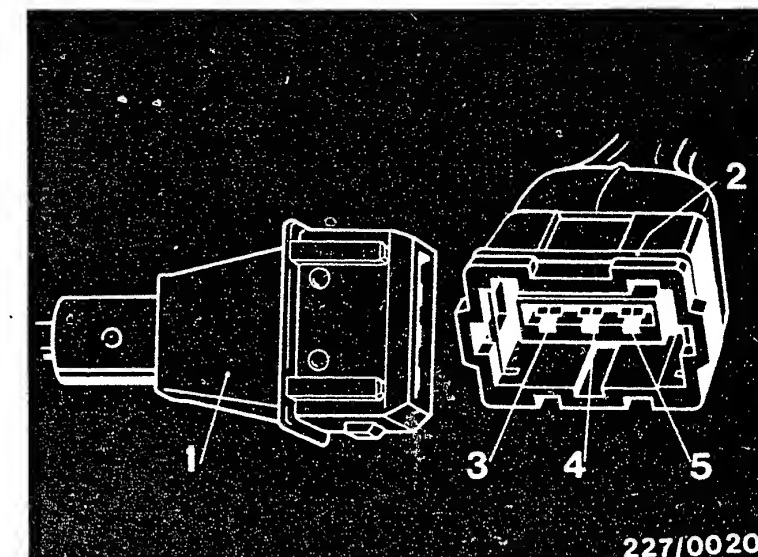
Does ignition-triggering unit pick-up lead
have continuity?

no

Eliminate open circuit.

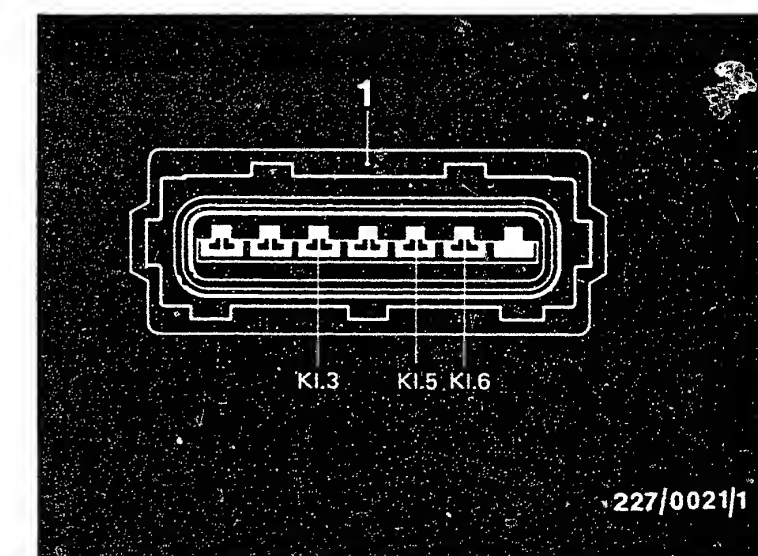
yes

Continued on C 7/8



- 1 = Ignition-triggering unit
connector
- 2 = Ignition-triggering unit
plug housing
- 3 = Term. -
- 4 = Term. 0
- 5 = Term. +

1 = Trigger-box plug



C5

Trouble-shooting program
BMW motorcycle



C6

Trouble-shooting program
BMW motorcycle



yes

Check magnetic pickup assembly voltage supply.

Connect trigger-box plug and ignition-triggering unit connector. Push back rubber sleeve of trigger-box plug.

Connect voltmeter with test prods to trigger-box plug term. 5 and term. 3.

Switch on ignition.

Indicated voltage must be 1.0 V to max. 3.5 V below battery voltage.

Voltage correct?

no

Disconnect trigger-box plug from trigger box.

Remove cable term. 5 from trigger-box plug, see picture.

Connect trigger-box plug.

Connect ammeter (mA measuring range) to removed cable term. 5 and trigger-box plug term. 4. See picture.

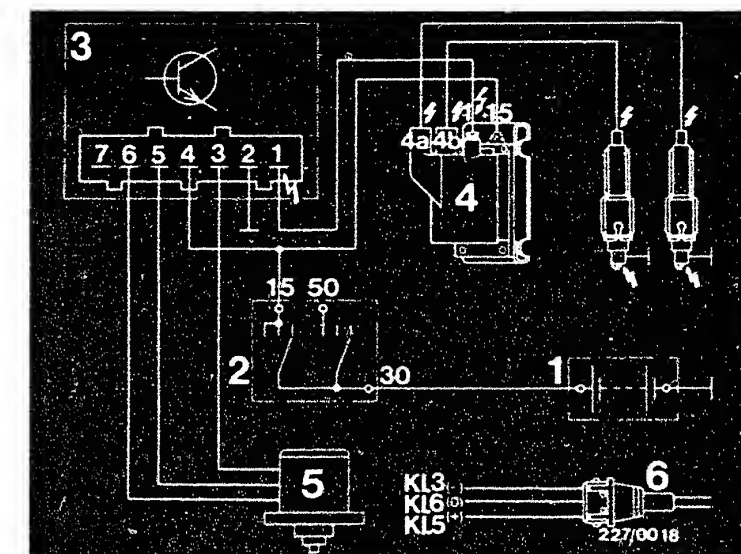
Switch on ignition.

If measured current is greater than 20 mA or 0 mA, then magnetic pickup assembly defective. (Replace ignition-triggering unit).

If measured current is between 3 and 20 mA, then replace trigger box.

yes

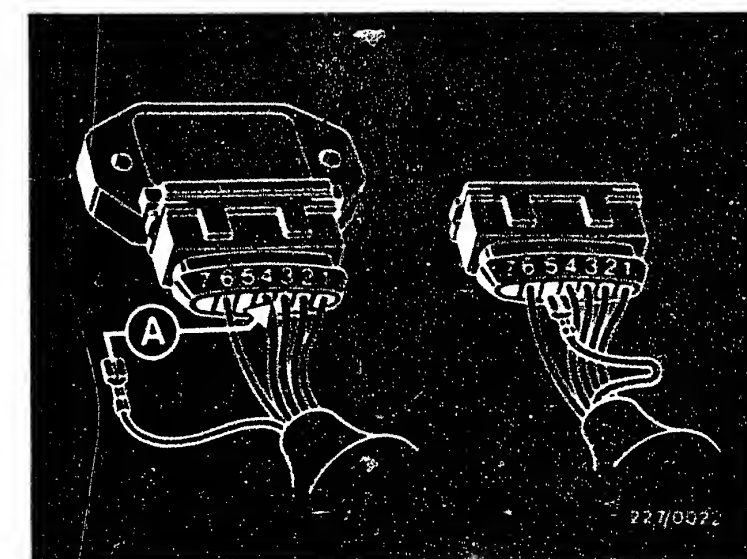
Continued on C 9/10



⚡ Dangerous voltages
(400 V - 25 kV)

- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Two-spark ignition coil
- 5 = Ignition-triggering unit
- 6 = Ignition-triggering unit connector

KL. = Terminal



C7

Trouble-shooting program
BMW motorcycle



C8

Trouble-shooting program
BMW motorcycle



yes

Check operation of magnetic pickup assembly

Remove cover from ignition-triggering unit. Using hexagon-socket-screw key (see picture), turn engine over by hand in clockwise direction until vane is outside air gap of magnetic pickup assembly (arrow).

To check the magnetic pickup assembly, use only a voltmeter with internal resistance (R_i) greater than 50 k Ω /V (otherwise incorrect measurement). Connect voltmeter with test prods to trigger-box plug term. 6 and term. 3. Switch on ignition. Voltmeter must indicate 0 - 0.7 V.

Voltage correct?

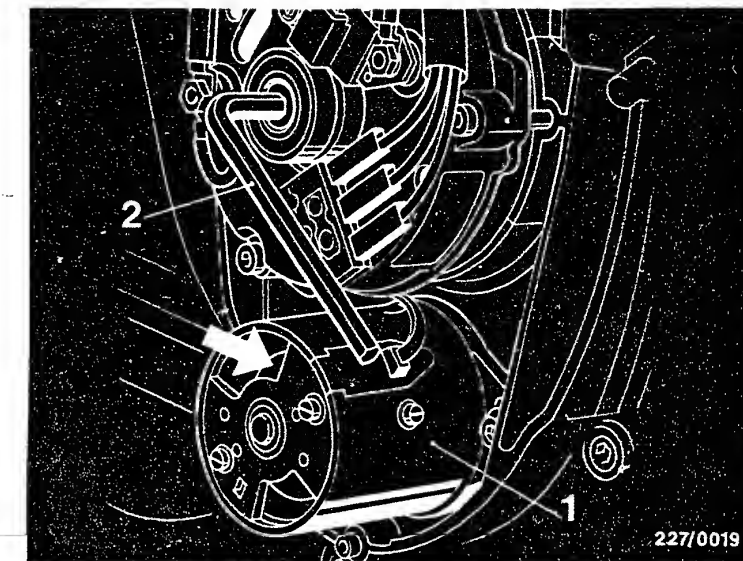
yes

Continued on C 11/12

no

Visual examination: Remove 3-pole ignition-triggering unit connector from plug housing and check plug-in connection (both parts) for oxidation. Remove oxidation.

Connect ignition-triggering unit connector to plug housing. If the specified voltages are still not reached, then the magnetic pickup assembly is defective (replace ignition-triggering unit).

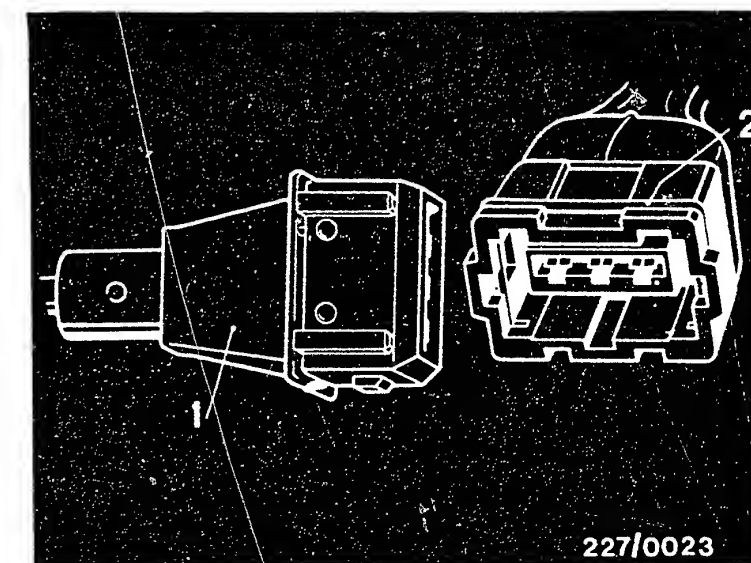


1 = Ignition-triggering unit without cover

2 = Hexagon-socket-screw key

1 = Ignition-triggering unit connector

2 = Ignition-triggering unit plug housing



C9

Trouble-shooting program
BMW motorcycle



C10

Trouble-shooting program
BMW motorcycle



yes

Check operation of magnetic pickup assembly.

Using hexagon-socket-screw key, turn engine over by hand in clockwise direction until vane is completely in air gap of magnetic pickup assembly (arrow).

To check the magnetic pickup assembly, use only a voltmeter with internal resistance (Ri) greater than 50 k Ω /V (otherwise incorrect measurement).

Connect voltmeter with test prods to trigger-box plug term. 6 and term. 3.
Switch on ignition.

Voltmeter must indicate 1.8 V to battery voltage.

Voltage correct?

yes

Replace trigger box

Test completed

Tests from B 5 onwards not necessary.

Note:

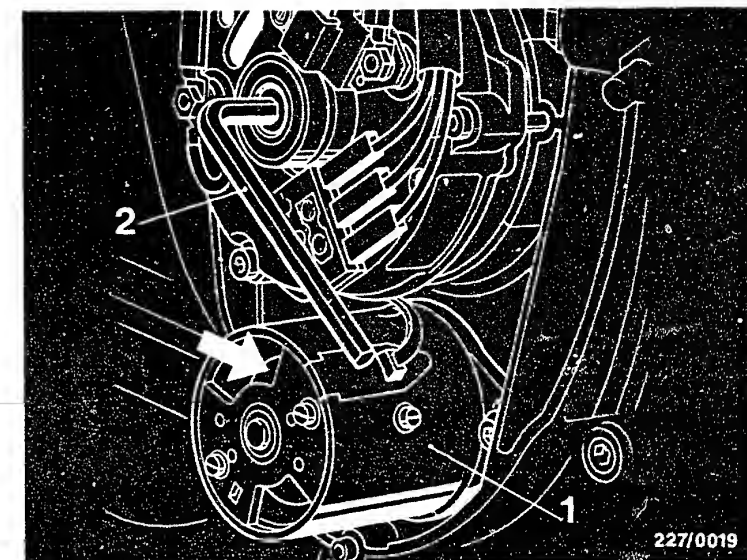
If the customer complaint has still not been rectified, faults are possible in the fuel system, or the engine is defective mechanically.

no

Remove 3-pole ignition-triggering unit connector (1) from plug housing (2) and clean plug-in connection (both parts).

Connect ignition-triggering unit connector to plug housing.

If the specified voltages are still not reached, then the magnetic pickup assembly is defective (replace ignition-triggering unit).

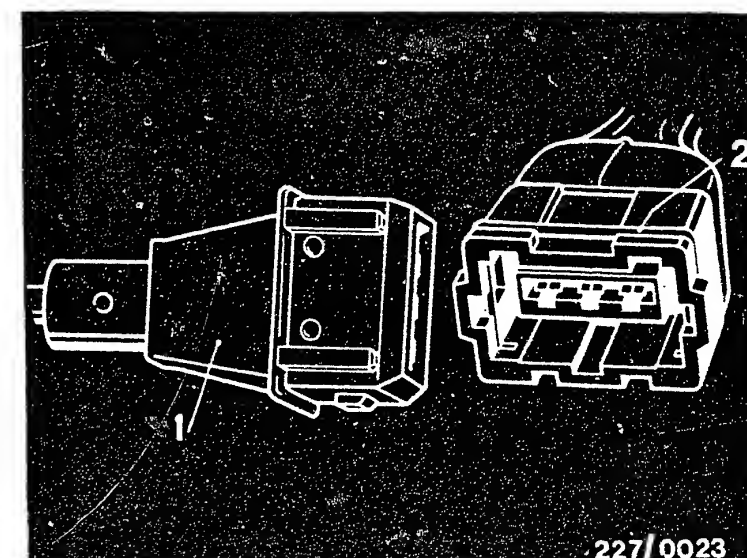


1 = Ignition-triggering unit without cover

2 = Hexagon-socket-screw key

1 = Ignition-triggering unit connector

2 = Ignition-triggering unit plug housing



C11

Trouble-shooting program

BMW motorcycle



C12

Trouble-shooting program

BMW motorcycle



After-sales Service

Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party

22

Danger of Accident on Semi-conductor Ignition Systems

VDT-I-227/102 B

11.1976

Please be sure to pass this bulletin on to your employees for their attention.

The increased demands made on their ignition systems by modern engines, and the wish for freedom from maintenance, led some time ago to manufactures starting to equip their vehicles with semi-conductor ignition systems as original equipment. In most cases the performance of nearly all makes of such systems is higher than that of conventional systems, and further improvements are to be expected. This means that semi-conductor ignition systems have reached the point where contact with "live" parts or contacts (whether on the primary side or the secondary side) can prove fatal.

In this connection we should like to point out to you that the laws valid in your country regarding work on high-voltage systems must be adhered to when working on, or testing, semi-conductor ignition systems.

As a matter of principle, when working on such ignition systems the ignition is to be switched off. Included in such work are the following operations:

- Connection of engine testing equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacement of ignition system parts (spark plugs, ignition coil, ignition distributor, H.T. ignition cables etc.).

If it is necessary to switch on the ignition in order to test the system or make adjustments on the engine (to the carburetor for instance), then lethal voltages are present throughout the entire system.

This means that the danger of accident exists not only at individual components in the system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also at the wiring harness (e.g. connection for the tachometer, diagnostic connector), on terminals, and on test equipment.

BOSCH

Geschäftsbereich KH, Kundendienst, Kfz-Ausrüstung.
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50 Printed in the Federal Republic of Germany.
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH.

L1

Technical Bulletin
BMW Motorcycles

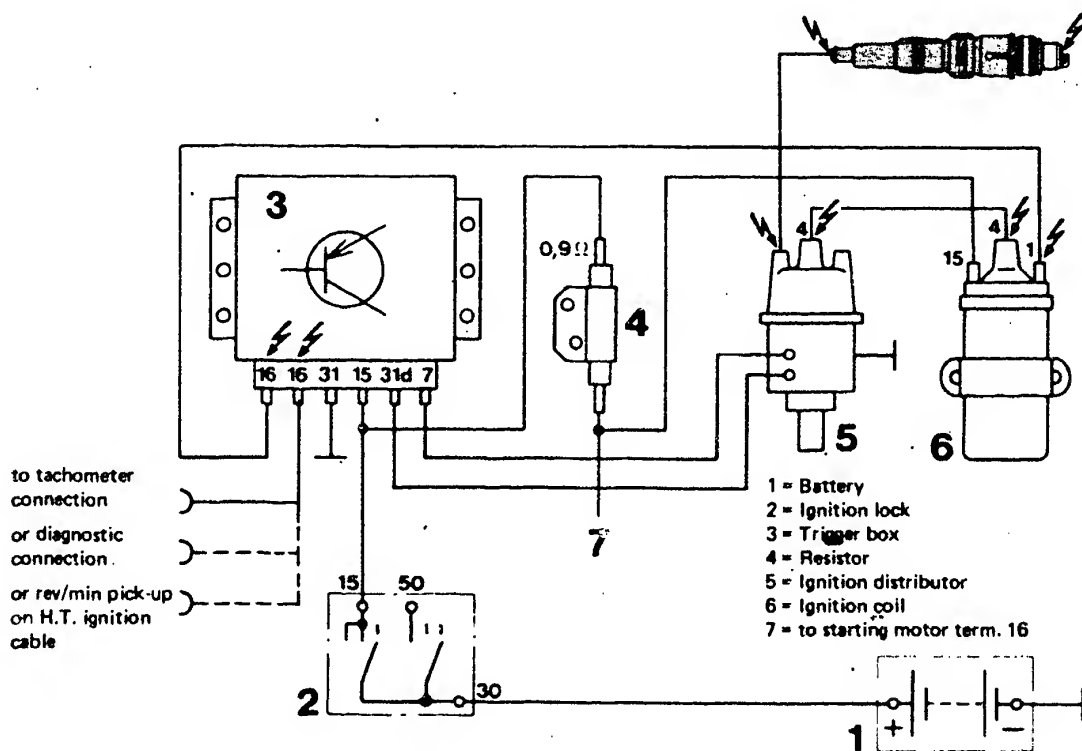


In addition, in the case of the capacitor-discharge ignition system (CDi), danger of accident is also present under the following circumstances:

- Operation of the trigger box without the ignition transformer.
- At the trigger box, (removed), relatively soon after it has been switched off (capacitor discharge).

Below is a typical terminal diagram of a semi-conductor ignition system, the danger points are marked with red high-voltage arrows. We would point out that all semi-conductor ignition systems, even the older ones, are to be regarded as dangerous in the sense as defined by this bulletin.

Please address any queries or comments concerning the contents of this publication to our representative in your country.



Terminal diagram



After-sales Service

Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party.

BREAKERLESS TRANSISTORIZED IGNITION SYSTEM

22

Warranty note

VDT-I-227/103 En

Hybrid construction trigger boxes

3.1979

0 227 100 100 for ignition distributor
with Hall generator (TCI-h)
0 227 100 102 for ignition distributor
with induction-type
pulse generator (TCI-i)

Apart from the well-known TCI trigger boxes 0 227 100 0.., trigger boxes of hybrid construction have been fitted as standard since 9.78 (Fig. 1).

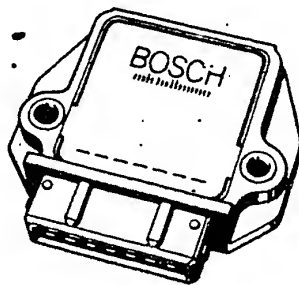


Fig. 1

Warranty procedure

If the complaints are justified, all these Hybrid trigger boxes are to be sent, along with completed warranty documents, to your authorized representative for forwarding to the following address:

ROBERT BOSCH GMBH
KH/LAV - Auspackraum

zur Weiterleitung an K1/VAK 21

D-7000 Stuttgart 30

This instruction remains valid until further notice.

BOSCH

Geschäftsbereich KH, Kundendienst, Kfz-Ausrüstung
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany.
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

L3

Technical Bulletin
BMW Motorcycles



After-sales Service

Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party

NEW DESIGNATIONS FOR IGNITION SYSTEMS

VDT-I-227/108 En

5.1981

The introduction of new ignition systems has made it necessary to reclassify all designations.
The designations listed below will be used immediately in KH workshops and in sales literature.

Designation	Abbreviated code	Meaning	Switching part	Ignition control and spark advance	High-voltage distribution
Coil ignition	SZ (CI)	-----	mechanical (breaker points)	mechanical (ignition distributor)	mechanical (ignition distributor)
Transistorized coil ignition	TSZ-k (TCI-c)	k=breaker-triggered	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)
Trigger box with traditional switching techniques	TSZ-I* (TCI-i)	I=induction type pulse generator	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)
	TSZ-H (TCI-h)	H=Hall generator	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)
Transistorized ignition (Trigger box in hybrid technique)	TZ-I* (TI-i)	I=induction type pulse generator	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)
	TZ-H* (TI-h)	H=Hall generator	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)

BOSCH

Geschäftsbereich KH Kundendienst, Kfz-Ausrüstung.
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany.
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

L4

Technical Bulletin

BMW Motorcycles



Designation	Abbreviated code	Meaning	Switching part	Ignition control and spark advance	High-voltage distribution
Electronic ignition	EZ-L	L=characteristic curve	electronic (trigger box or control unit)	electronic (control unit)	mechanical (ignition distributor)
	EZ-F	F=ignition map	electronic (trigger box or control unit)	electronic (control unit)	mechanical (high-voltage distributor)
Distributorless semiconductor ignition	VZ-L	L=characteristic curve	electronic (control unit)	electronic (control unit)	electronic (two-spark ignition coil, or 1 ignition coil/spark plug)
	VZ-F	F=ignition map	electronic (control unit)	electronic (control unit)	electronic (two-spark ignition coil, or 1 ignition coil/spark plug)

* Please note: The ignition system can additionally be fitted with a DLS unit (digital idle stabilizer) or with an ELS unit (electronic idle stabilizer) or with an ESV unit (electronic ignition retardation).



After-sales Service

Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

INCORRECT DISPLAY OF ROTATIONAL SPEED AND
DWELL ANGLE ONLY WITH TRIGGER BOXES
0 227 100 ... (TCI-i, TCI-h) WITH CURRENT
LIMITATION

VDT-I-Gen. 030 En
6.80
Supersedes Ed. 3.80

For additional information see VDT-I-Gen. 032 En

1. General

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle when testing the ignition system. However, there is no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Incorrect displays may occur with the testers listed below:

MOT	001.00}	Rotational-speed	KTE	001.00
	001.01}	display O.K. with these		001.02
	001.02	testers		001.03
	001.04			
	002.00			

By now, the following vehicles may be fitted with breakerless ignition systems with current limitation:

Audi	(Bosch/Fairchild- ignition system)	Mazda	(Mitsubishi ignition system)
BMW	(Bosch ignition system)	Mitsubishi	(Mitsubishi ignition system)
Citroen	(Delco ignition system)	Nissan-Datsun	(Hitachi ignition system)
Fiat	(Delco ignition system)	Peugeot	(Bosch ignition system)
Ford	(Delco ignition system)	VW	(Bosch/Fairchild ignition system)
General- Motors	(HEI-ignition system)	Bosch transistorized ignition system for retrofitting 0 227 100 920	

BOSCH

Geschäftsbereich KH Kundendienst, Kfz-Ausstattung
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50. Printed in the Federal Republic of Germany
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

L6

Motor Vehicle Service Information

BMW Motorcycles



2. Test instructions

2.1 Rotational speed

Incorrect rotational-speed display can be recognized as follows:

If one starts at the idle speed and slowly increases the engine speed, then the incorrect display can be recognized by an abrupt reduction in the rotational-speed display (e.g. from 2400 min⁻¹ to 1200 min⁻¹).

It is, however, possible to attain correct rot.-speed measurements as follows:

Connect a ballast resistor of 0.9 or 1.0 Ohm (see Fig.) in series in the line to term. 15 of the ignition coil (take care not to cause a short circuit). After the rotational-speed measurement, the ballast resistor must be removed (otherwise starting difficulties and misfiring). Connect tester as per operating instructions.

Suggestion for user manufacture

Required parts:

1 ballast resistor 0.9 Ohm

Part No. 0 227 900 002

or

1 ballast resistor 1.0 Ohm

Part No. 0 227 900 101

2 blade receptacles e.g.

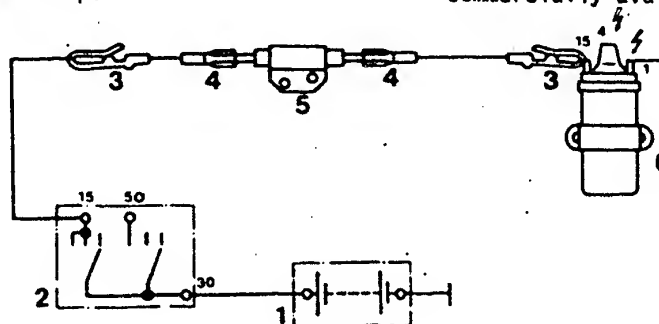
Part No. 1 901 355 881

approx. 0.2 m cable, 1.5 mm² e.g.

Part No. 6 210 150 150

2 insulated clips

Commercially available



1 = Battery

4 = Blade receptacle

⚡ approx. 400 V

2 = Ignition switch

5 = Ballast resistor

⚡ approx. 25 kV

3 = Clips

6 = Ignition coil

2.2 Dwell angle

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.

2.3 Ignition point

Is displayed correctly. Connect tester as per operating instructions.



After-sales Service

Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party

MOTORTESTER CONVERSION

Incorrect display of rotational speed,
dwell angle and ignition point
only with trigger boxes
0 227 100 ... (TCI-i, TCI-h) with current
limitation

VDT-I-Gen. 032 En
6.80

For additional information see VDT-I-Gen. 030 of 6.80

Re.: Motortester EFAW 268
268 S 10
269
214 B
AE 2000

1. General

Please make sure that the above-mentioned motortesters in your workshop and at your customers (e.g. motor vehicle workshops, oil companies, gas stations, vocational schools etc.) are converted. The conversion is subject to payment and is carried out by the K7 after-sales service of the responsible BG. The standard time is 15 work units (with fitting of switch).

2. Why motortester conversion?

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle as well as to incorrect triggering of the meter when testing the ignition system. There is, however, no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Since, with the above-listed motortesters, the timing light is triggered by the signal path dwell angle - meter, this incorrect triggering also leads to incorrect flashing and thus to an incorrect display of the advance angle.

3. Conversion measures

The situation is to be remedied by modifying the wiring of the testers so that the timing light is triggered by the clamp-on induction pickup and the pulse shaper stage.

BOSCH

Geschäftsbereich KH Kundendienst K12-Ausstattung
© by Robert Bosch GmbH, D-7 Stuttgart 1 Postfach 50 Printed in the Federal Republic of Germany
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

L8

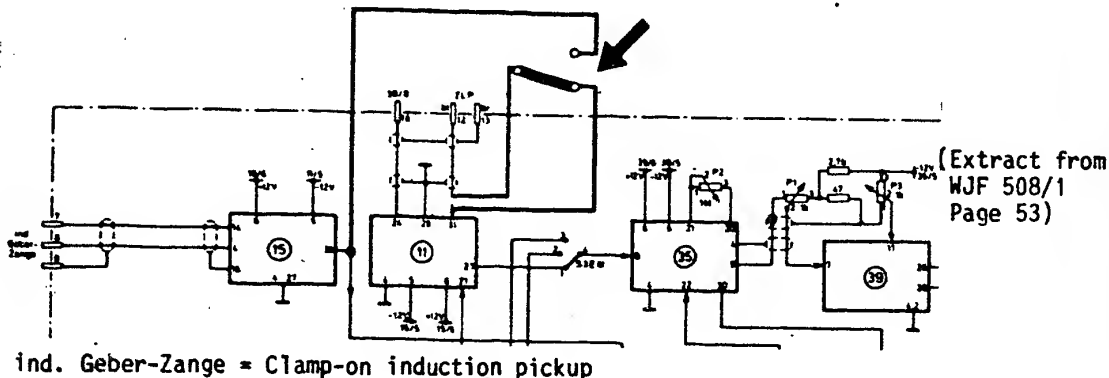
Motor Vehicle Service Information
BMW Motorcycles



EFAW 268, 268 S 10, 269, AE 2000

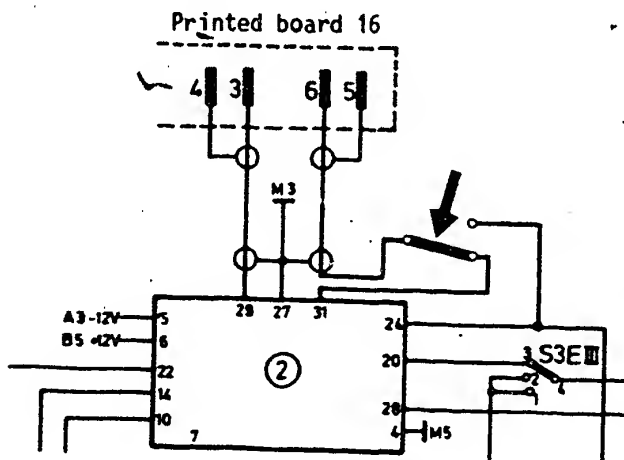
Remove the line of the ZLP* from pin 31 of printed board 11 (coupling stage) and connect to pin 30 of printed board 15 (pulse shaper stage) via a switch with change-over contact (e.g. 0 341 500 803). In addition, a new line must be connected from pin 31 of printed board 11 to the other contact of the switch with change-over contact.

* ZLP = timing light



EFAW 214 B

Remove the line from terminal 6 of printed board 16 to pin 31 of printed board 2 (coupling stage) and connect to pin 24 of the same printed board via a switch with change-over contact (e.g. 0 341 500 803). In addition, a new line must be connected from pin 31 of printed board 2 to the other contact of the switch with change-over contact. Arrow points to switch with change-over contact.



(Extract from WJF 503/1, Page 64)

By fitting the switch with change-over contact in the front panel of the motor-tester, it is possible to switch over from standard ignition systems to those with current limitation. We recommend that the switch positions be marked correspondingly: e.g. "standard" - "current limitation". These conversion measures have already been published in the K7 information sheet KJF 28/7911.

4. Test instructions

4.1 Standard ignition systems

Switch position: "standard"

All other tester connections as per operating instructions.

4.2 Ignition systems with current limitation

Switch position: "current limitation"

In order to trigger the timing light, the induction-type pulse generator (clamp-on pickup or red pickup) must always be connected during the measurement.

The selector switch for ignition systems built into the motortester must be switched to standard coil ignition (not to TCI) with these ignition systems.

All other tester connections as per operating instructions.

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.



After-sales Service

Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

TESTS ON ELECTRONIC IGNITION SYSTEMS

VDT-I-Gen. 035 En

(TCI, TZ)

3.1981

TESTER INSTRUCTIONS

The following tests are listed in older and current Tester operating instructions or in Trouble-shooting with the oscillograph:

- "Separate ignition coil test" (concerns EFAW 213, 214, 268, AE 2000).
- Calculating the "ignition voltage reserve" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).
- "Intensified insulation test" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).

Nowadays transistorized ignition systems deliver more than 30,000 V secondary voltage.

To avoid damage to ignition coil, ignition cable and ignition distributor by voltage flashovers, the tests listed above should not be carried out on transistorized ignition systems.

The contents of this Service Information has already been published in the K7-Information K7-VJF 17/8012.

BOSCH

Geschäftsbereich KH Kundendienst Kfz-Ausrüstung
© by Robert Bosch GmbH, D-7 Stuttgart 1, Postfach 50 Printed in the Federal Republic of Germany.
Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH.

L11

Motor Vehicle Service Information

BMW Motorcycles



Table of contents

Section

Coordinates

Structure of microfiche.....	A 1
1. Rapid diagnosis chart	A 2
2. Test specifications	A 7
3. Electrical terminal diagram	A 8
4. Installation position of components	A 9
5. Necessary test equipment, aids	A 10
6. Danger of accident on electronic ignition systems	A 11
7. Incorrect indication of engine speed, dwell angle and ignition point	A 14
8. Important vehicle information	A 15
9. Necessary preliminary work for the following tests	A 21
10. Trouble-shooting program	B 1
Test if primary voltage/ignition spark present	B 3
Test if primary voltage/ignition spark <u>not</u> present	C 1



<u>Section</u>	<u>Coordinates</u>
Technical Bulletin (Danger of accident)	L 1
Technical Bulletin (Warranty information)	L 3
Technical Bulletin (New designations for ignition systems)	L 4
Motor Vehicle Service Information (Incorrect display of Rotational Speed and Dwell Angle)	L 6
Motor Vehicle Service Information (Motortester conversion)	L 8
Motor Vehicle Service Information (Tests on electronic ignition systems)	L 11

